Report on the Radio Testing

For

Sepura Limited

on

SC20 Series (SC2024 Tested)

Report no. TRA-057920-45-19C

12th June 2023

Report Number: TRA-057920-45-19C
Issue: C

# REPORT ON THE RADIO TESTING OF A
Sepura Limited
SC20 Series (SC2024 Tested)
WITH RESPECT TO SPECIFICATIONS
FCC 47CFR 15.247 (Limited Testing Only) ISED RSS-247 (Limited Testing Only)
TO SATISFY MODULAR INTEGRATION REQUIREMENTS OF
KDB 996369 D04 v02 and RSP-100, Issue 12

TEST DATE: 2022-07-27

Tested by: D Garvey

Written by: D Garvey
Radio Test Engineer

Approved by: Digitally signed by John Charters Date: 2023.06.13 13:57:21 +01'00'
J Charters
Laboratory Manger

Date: 12th June 2023

# 1 Revision Record

| *Issue Number* | *Issue Date* | *Revision History* |
|---|---|---|
| A | 25th January 2023 | Original |
| B | 10th March 2023 | Updates to FCC & ISED ID and serial number |
| C | 3rd May 2023 | Update to Build Level / Revision Number |
| D | 12th June 2023 | As per Sepura request the Output power testing was removed from this version of the report |

## 2 Summary

| | |
|---|---|
| TEST REPORT NUMBER: | TRA-057920-45-19C |
| WORKS ORDER NUMBER: | TRA-057920-10 |
| PURPOSE OF TEST: | Modular Integration |
| TEST SPECIFICATION: | 47CFR15.247 & RSS-247 (Limited testing only) |
| EQUIPMENT UNDER TEST (EUT): | SC20 Series (SC2024 Tested) |
| FCC IDENTIFIER: | XX6SC2024M |
| ISED IDENTIFIER: | 8739A-SC2024M |
| EUT SERIAL NUMBER: | 1PR002224GK55E1 |
| MANUFACTURER/AGENT: | Sepura Limited |
| ADDRESS: | 9000 Cambridge Research Park<br>Beach Drive<br>Waterbeach<br>Cambridge<br>CB25 9TL<br>United Kingdom |
| CLIENT CONTACT: | James O'Reilly<br>☎ 01223 876000<br>✉ James.OReilly@sepura.com |
| ORDER NUMBER: | PLC-PO022050-2 |
| TEST DATE: | 2022-07-27 |
| TESTED BY: | D Garvey<br>Element |

### *2.1 Test Summary*

| *Test Method and Description* | *Requirement Clause 47CFR15* | *Requirement Clause RSS* | *Applicable to this equipment* | *Result / Note* |
|---|---|---|---|---|
| Radiated spurious emissions (restricted bands of operation and cabinet radiation) | 15.247(d) | 247, 3.3 | ☒ | *Pass* |
| AC power line conducted emissions | 15.207 | Gen, 8.8 | ☐ | *Note 1* |
| Carrier frequency separation | 15.247 (a) (1) | 247, 5.1 (b) | ☐ | *Note 1* |
| Number of hopping channels | 15.247 (a) (1) (i), (ii) and (iii) | 247, 5.1 (c), (d) and (e) | ☐ | *Note 1* |
| Average time of occupancy | 15.247 (a) (1) (i), (ii) and (iii) | 247, 5.1 (c), (d) and (e) | ☐ | *Note 1* |
| Maximum peak conducted output power | 15.247 (a) (1), (b)(1) and (b)(2) | 247, 5.4 (a), (b) and (c) | ☐ | *Note 1* |
| 20 dB emission bandwidth | 15.247 (a) (1) (i) and (ii) | 247, 5.1 (a) | ☐ | *Note 1* |
| Out-of-band emissions | 15.247(d) | 247, 5.5 | ☐ | *Note 1* |
| Calculation of duty correction | - | 15.35 (c) | ☒ | *N/A* |

**Specific Note:**

1. Limited testing was performed to check transmitter radiated spurious emissions only on a single channel and mode, as requested by the client

**General Notes:**

The results contained in this report relate only to the items tested, in the condition at time of test, and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.

The apparatus was set up and exercised using the configurations, modes of operation and arrangements defined in this report only. Any modifications made are identified in Section 8 of this report.

Particular operating modes, apparatus monitoring methods and performance criteria required by the standards tested to have been performed except where identified in Section 5.2 of this test report (Deviations from Test Standards).

# 3 Contents

# 4 Introduction

This report TRA-057920-45-19C presents the results of the Radio testing on a Sepura Limited, SC20 Series (SC2024 Tested) to specifications 47CFR15 Radio Frequency Devices (limited testing) and RSS-247 - Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices (limited testing).

The testing was carried out for Sepura Limited by Element, at the address detailed below.

☒ Element Hull
Unit E
South Orbital Trading Park
Hedon Road
Hull
HU9 1NJ
UK

☐ Element Skelmersdale
Unit 1
Pendle Place
Skemersdale
West Lancashire
WN8 9PN
UK

This report details the configuration of the equipment, the test methods used and any relevant modifications where appropriate.

All test and measurement equipment under the control of the laboratory and requiring calibration is subject to an established programme and procedures to control and maintain measurement standards. The quality management system meets the principles of ISO 9001, and has quality control procedures for monitoring the validity of tests undertaken. Records and sufficient detail are retained to establish an audit trail of calibration records relating to its test results for a defined period. Under control of the established calibration programme, key quantities or values of the test & measurement instrumentation are within specification and comply with the relevant traceable internationally recognised and appropriate standard specifications, which are UKAS calibrated as such where these properties have a significant effect on results. Participation in inter-laboratory comparisons and proficiency testing ensures satisfactory correlation of results conform to Elements own procedures, as well as statistical techniques for analysis of test data providing the appropriate confidence in measurements.

Throughout this report EUT denotes equipment under test.

FCC Site Listing:
The test laboratory is accredited for the above sites under the following US-UK MRA, Designation numbers.

Element Hull UK2007

ISED Registration Numbers:
Element Hull 3483A

The test site requirements of ANSI C63.4-2014 are met up to 1 GHz.

The test site SVSWR requirements of CISPR 16-1-4:2010 are met over the frequency range 1 GHz to 18 GHz.

# 5 Test Specifications

## *5.1 Normative References*

- FCC 47 CFR Ch. I – Part 15 – Radio Frequency Devices.
- ISED RSS-247, Issue 2, February 2017 – Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices.
- ISED RSS-Gen, Issue 5, March 2019 – General Requirements for Compliance of Radio Apparatus.
- ANSI C63.10-2013 – American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.
- ANSI C63.4-2014 – American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.
- KDB996369 D04 Module Integration Guide v02 – Modular Transmitter Integration Guide - Guidance for Host Product Manufacturers.
- RSP-100, Issue 12, August 2019 – Certification of Radio Apparatus and Broadcasting Equipment.

## *5.2 Deviations from Test Standards*

Limited testing was performed to check transmitter radiated spurious emissions only, as requested by the client, to satisfy modular integration requirements of KDB996369 D04 v02 and RSP-100, Issue 12.

# 6 Glossary of Terms

| | |
|---|---|
| **§** | denotes a section reference from the standard, not this document |
| **AC** | Alternating Current |
| **ANSI** | American National Standards Institute |
| **BW** | bandwidth |
| **C** | Celsius |
| **CFR** | Code of Federal Regulations |
| **CW** | Continuous Wave |
| **dB** | decibel |
| **dBm** | dB relative to 1 milliwatt |
| **DC** | Direct Current |
| **DSSS** | Direct Sequence Spread Spectrum |
| **EIRP** | Equivalent Isotropically Radiated Power |
| **ERP** | Effective Radiated Power |
| **EUT** | Equipment under Test |
| **FCC** | Federal Communications Commission |
| **FHSS** | Frequency Hopping Spread Spectrum |
| **Hz** | hertz |
| **IC** | Industry Canada |
| **ITU** | International Telecommunication Union |
| **LBT** | Listen before Talk |
| **m** | metre |
| **max** | maximum |
| **MIMO** | Multiple Input and Multiple Output |
| **min** | minimum |
| **MRA** | Mutual Recognition Agreement |
| **N/A** | Not Applicable |
| **PCB** | Printed Circuit Board |
| **PDF** | Portable Document Format |
| **Pt-mpt** | Point-to-multipoint |
| **Pt-pt** | Point-to-point |
| **RF** | Radio Frequency |
| **RH** | Relative Humidity |
| **RMS** | Root Mean Square |
| **Rx** | receiver |
| **s** | second |
| **SVSWR** | Site Voltage Standing Wave Ratio |
| **Tx** | transmitter |
| **UKAS** | United Kingdom Accreditation Service |
| **V** | volt |
| **W** | watt |
| **Ω** | ohm |

# 7 Equipment under Test

## *7.1 EUT Identification*

- Name: SC20 Series (SC2024 Tested)
- Serial Number: 1PR002224GK55E1
- Model Number: SC2024
- Software Revision: 2001 723 07367
- Build Level / Revision Number: PLX-2116515-01 (H/w mod state 11)

## *7.2 System Equipment*

Equipment listed below forms part of the overall test setup and is required for equipment functionality and/or monitoring during testing. The compliance levels achieved in this report relate only to the EUT and not items given in the following list.

*Element Laptop*
*USB programming cable*

## *7.3 EUT Mode of Operation*

The unit was connected via the USB lead and scripts, provided by the manufacturer, were sent to the EUT via a terminal program. The unit was put into a mode transmitting a modulated signal on the required frequencies.

## *7.4 EUT Radio Parameters*

| | |
|---|---|
| ***Frequency of operation:*** | 2402 MHz to 2480 MHz |
| ***Declared output power:*** | 10 dBm EIRP |
| ***Antenna type and gain:*** | Integral PCB 2.5 dBi |
| ***Nominal supply voltage:*** | 7.4 Vdc (from rechargeable battery) |

## *7.5 EUT Description*

The EUT is a TETRA hand held portable radio with BT, BLE, 2.4 GHz WiFi and GNSS.

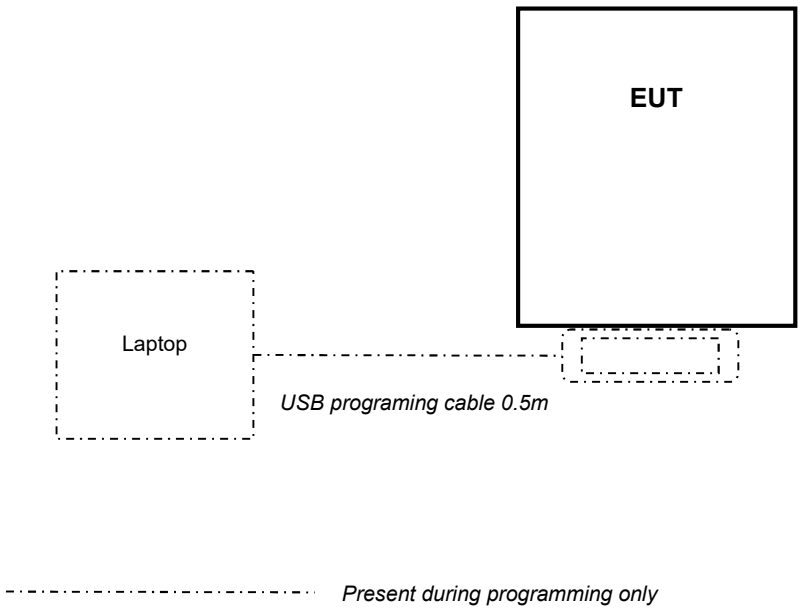
# 8 Modifications

No modifications were performed during this assessment.

# 9 EUT Test Setup

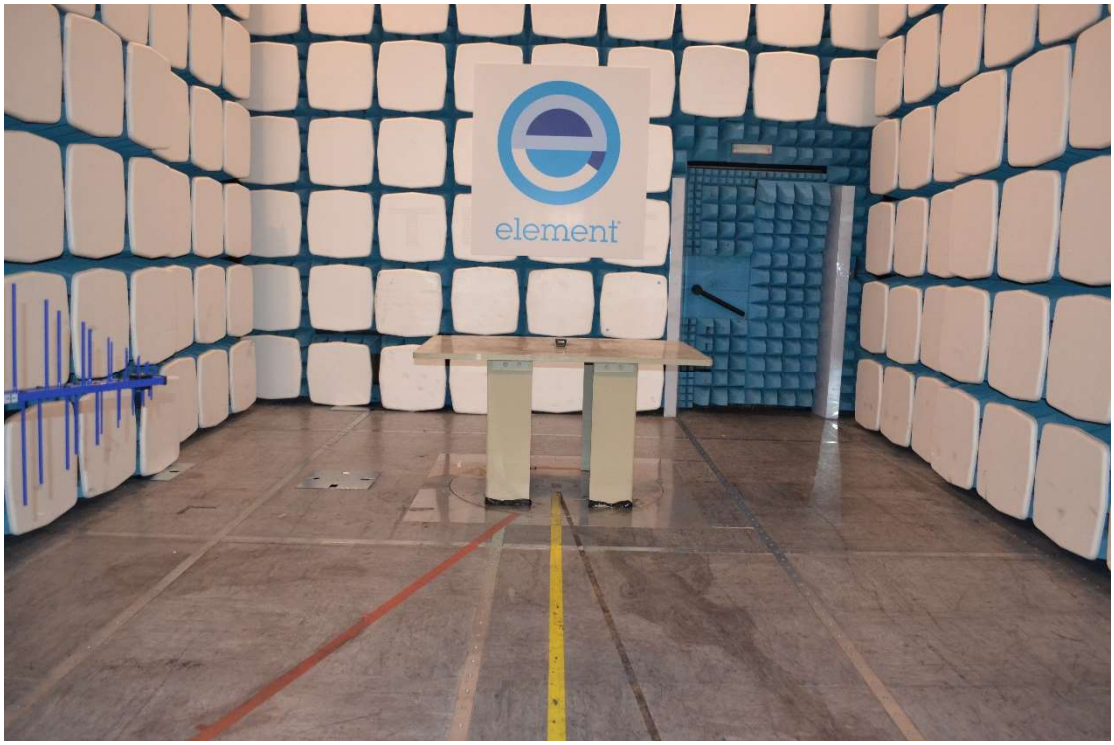
## *9.1 Block Diagram*

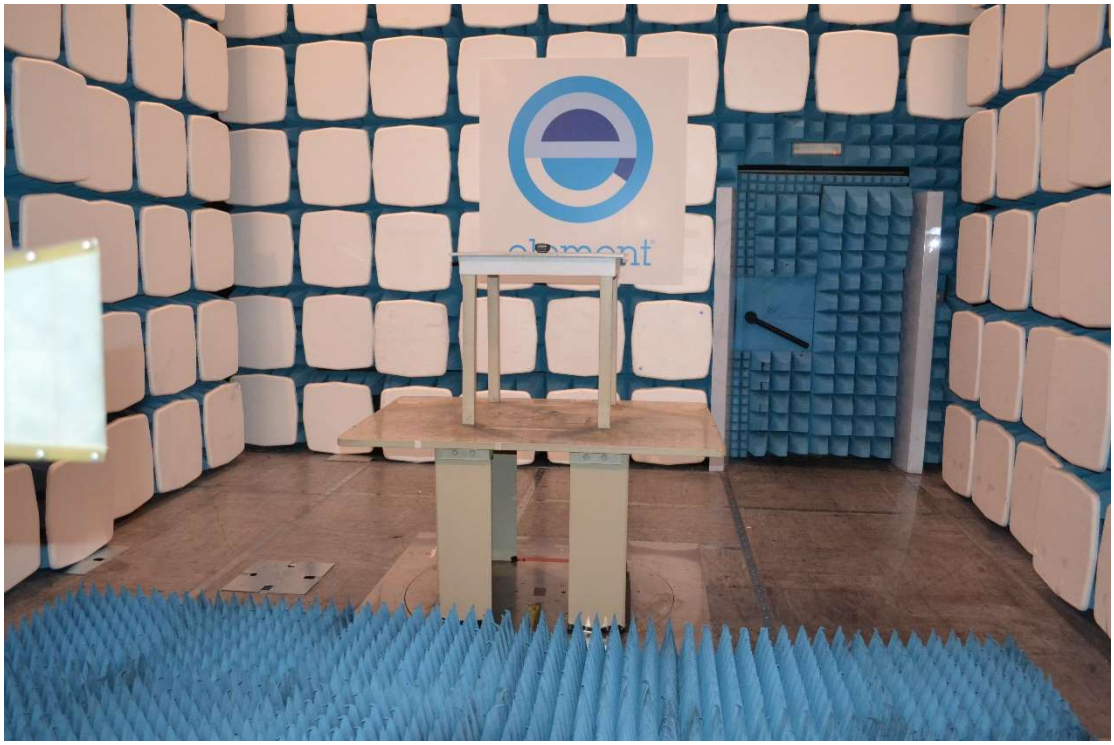
The following diagram shows basic EUT interconnections:



### *9.2 General Set-up Photograph*

The following photograph shows basic EUT set-up:



### *9.3 Measurement Software*

Where applicable, the following software was used to perform measurements contained within this report.

Element Emissions R5

# 10 General Technical Parameters

## *10.1 Normal Conditions*

The EUT was tested under the normal environmental conditions of the test laboratory, except where otherwise stated. The normal power source applied was 7.4 Vdc from the lithium polymer rechargeable battery.

# 11 Radiated emissions

## *11.1 Definitions*

*Spurious emissions*
Emissions on a frequency or frequencies, which are outside the necessary bandwidth and the level of which may be reduced without affecting the corresponding transmission of information. Spurious emissions include harmonic emissions, parasitic emissions, intermodulation products and frequency conversion products, but exclude out-of-band emissions.

*Restricted bands*
A frequency band in which intentional radiators are permitted to radiate only spurious emissions but not fundamental signals.

## *11.2 Test Parameters*

| | |
|---|---|
| Test Location: | Element Hull |
| Test Chamber: | Wireless Lab 2 |
| Test Standard and Clause: | ANSI C63.10-2013, Clause 6.5 and 6.6 |
| EUT Frequencies Measured: | 2402 MHz, 2442 MHz, 2480 MHz |
| Deviations from Standard: | None |
| Measurement BW: | 30 MHz to 1 GHz: 120 kHz; Above 1 GHz: 1 MHz |
| Measurement Detector: | Up to 1 GHz: Quasi-Peak; Above 1 GHz: CISPR average and Peak |

**Environmental Conditions (Normal Environment)**

| | |
|---|---|
| Temperature: 22 °C | +15 ºC to +35 ºC (as declared) |
| Humidity: 45 %RH | 20 %RH to 75 %RH (as declared) |
| Supply: 7.4 Vdc | As declared |

**Test Limits**

Unwanted emissions that fall within the restricted frequency bands shall comply with the limits specified:

**General Field Strength Limits for License-Exempt Transmitters at Frequencies above 30 MHz**

| *Frequency (MHz)* | *Field Strength (µV/m at 3 m)* | *Field Strength (dBµV/m at 3 m)* |
|---|---|---|
| 30 to 88 | 100 | 40.0 |
| 88 to 216 | 150 | 43.5 |
| 216 to 960 | 200 | 46.0 |
| Above 960 | 500 | 54.0 |

On frequencies below or equal to 1000 MHz, the limits shown are based on measuring equipment employing a CISPR quasi-peak detector function. On frequencies above 1000 MHz, the radiated emission limits are based on the use of measurement instrumentation employing an average detector function. The limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit.

### *11.3 Test Method*

With the EUT setup as per section 9 of this report and connected as per Figure i, the emissions from the EUT were measured on a spectrum analyzer / EMI receiver.

Radiated electromagnetic emissions from the EUT are checked first by preview scans. Preview scans for all spectrum and modulation characteristics are checked, using a peak detector and where applicable worst-case determined for function, operation, orientation, etc. for both vertical and horizontal polarisations. Pre-scan plots are shown with a peak detector and 100 kHz RBW.

If the EUT connects to auxiliary equipment and is table or floor standing, the configurations prescribed in ANSI C63.10 are followed. Alternatively, a layout closest to normal use (as declared by the provider) is employed, (see EUT setup photographs for more detail).

Emissions between 30 MHz and 1 GHz are measured using calibrated broadband antennas. Emissions above 1 GHz are characterized using standard gain horn antennas. Pre-amplifiers and filters are used where required. Care is taken to ensure that test receiver resolution bandwidth, video bandwidth and detector type(s) meet the regulatory requirements.

For both horizontal and vertical polarizations, the EUT is then rotated through 360 degrees in azimuth until the highest emission is detected. At the previously determined azimuth the test antenna is raised and lowered from 1 to 4 m in height until a maximum emission level is detected, this maximum value is recorded.

Power values measured on the test receiver / analyzer are converted to field strength, FS, in dBµV/m at the regulatory distance, using:

$$FS = PR + CL + AF – PA + DC – CF$$

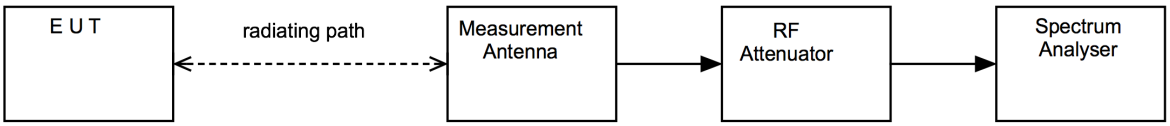
Where,

PR is the power recorded on the receiver / spectrum analyzer in dBµV;
CL is the cable loss in dB;
AF is the test antenna factor in dB/m;
PA is the pre-amplifier gain in dB (where used);
DC is the duty correction factor in dB (where used, e.g. harmonics of pulsed fundamental);
CF is the distance factor in dB (where measurement distance different to limit distance);

$$Factor = CL + AF - PA$$

This field strength value is then compared with the regulatory limit.

**Figure i Test Setup**



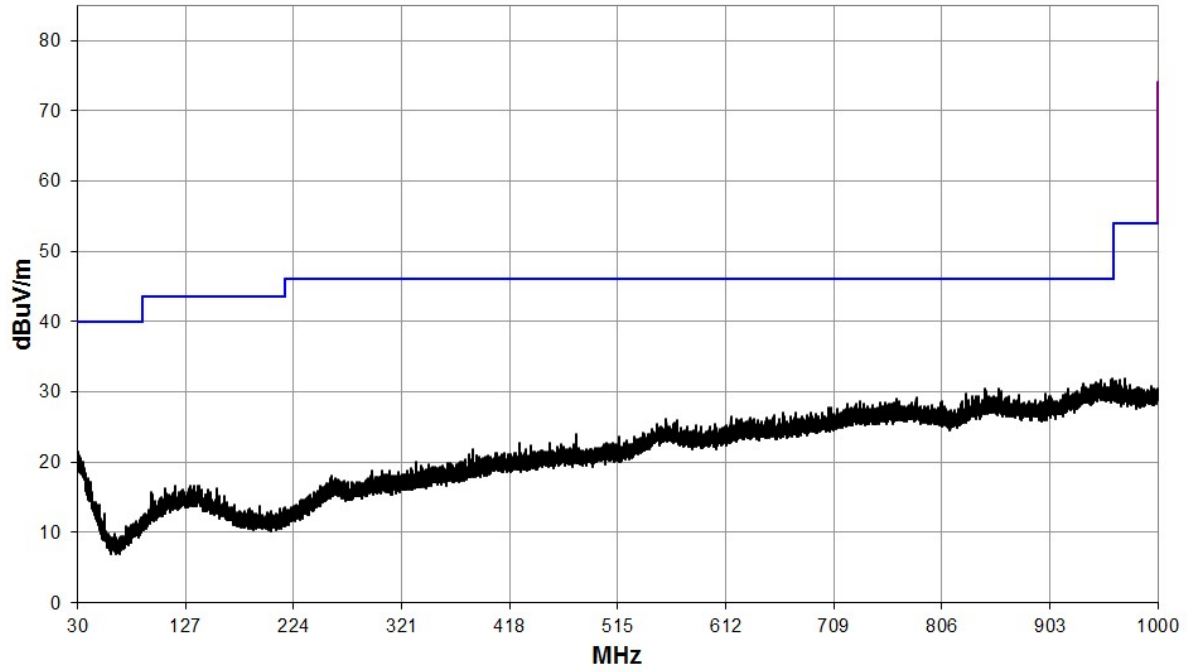
### *11.4 Test Equipment*

| Equipment Type | Manufacturer | Equipment Description | Element No | Due For Calibration |
|---|---|---|---|---|
| ATS | Rainford | Ferrite Lined Chamber | REF886 | 2024-06-15 |
| 3115 | EMCO | Horn Antenna | RFG129 | 2024-01-31 |
| 8449B | Agilent | Pre-Amp (1 - 26.5 GHz) | REF913 | 2023-03-24 |
| 310 | Sonoma | Pre-Amp (9 kHz – 1 GHz) | REF927 | 2023-07-18 |
| N9030A | Agilent | Spectrum Analyser | REF2167 | 2022-08-25 |
| FSU50 | R&S | Spectrum Analyser | U544 | 2022-11-12 |
| LB-90-25-C2-SF | A Info Inc | Horn Antenna | REF2243 | 2024-07-12 |
| LB-62-25-C-SF | A Info Inc | Horn Antenna | REF2244 | 2024-07-11 |
| LB-180400-25-C-KF | A Info Inc | Horn Antenna | REF2246 | 2022-07-28 |
| Emissions R5 | Element | Radiated Test Software | REF9000 | Cal not required |
| SN 4478 | BSC | Band Stop Filter | REF2158 | Cal in use |

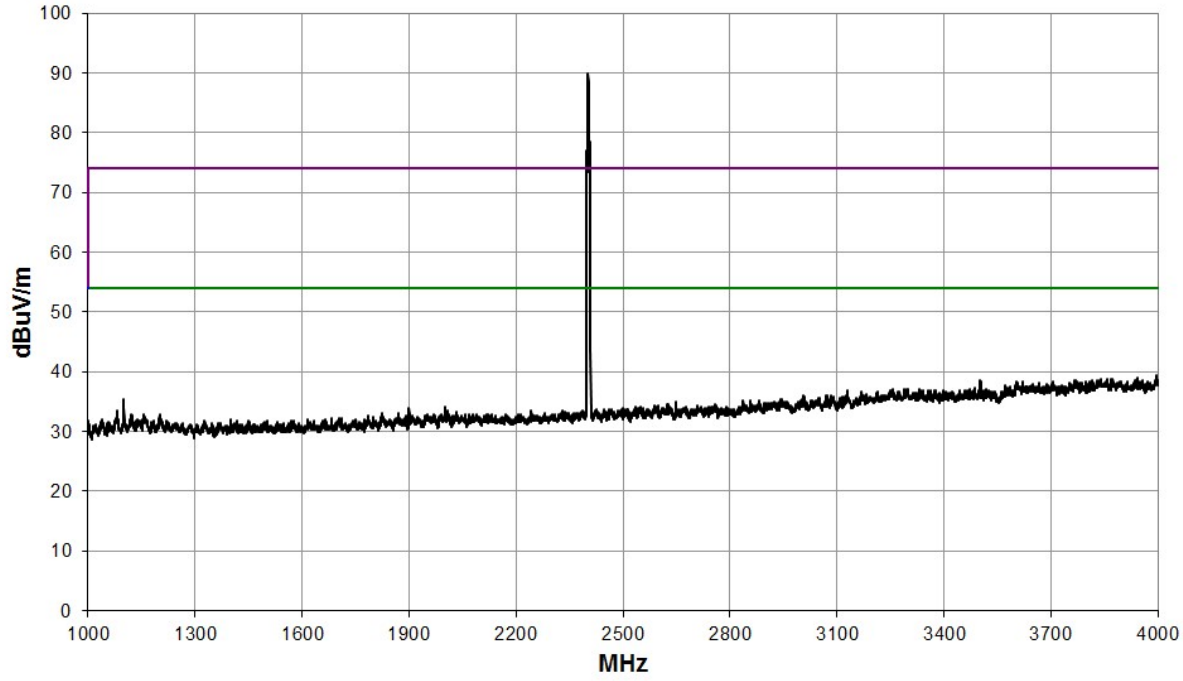
### *11.5 Test Results*

| ***Frequency: 2402 MHz; Power Setting: Default; Modulation: GFSK*** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| ***Detector*** | ***Freq. (MHz)*** | ***Meas'd Emission (dBµV)*** | ***Factor (dB)*** | ***Duty Cycle Corr'n (dB)*** | ***Distance Extrap'n Factor (dB)*** | ***Field Strength (dBµV/m)*** | ***Limit (dBµV/m)*** | ***Margin (dB)*** |
| No spurious emissions were detected within 20 dB of the limit. | | | | | | | | |

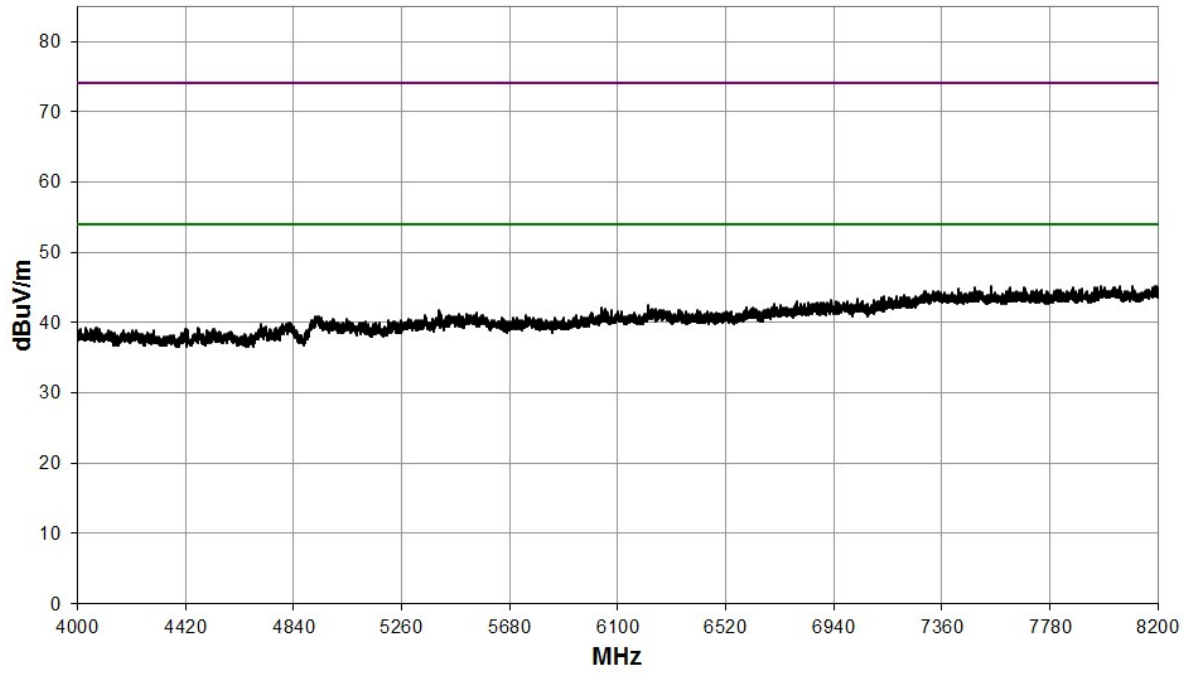
30 MHz to 1 GHz



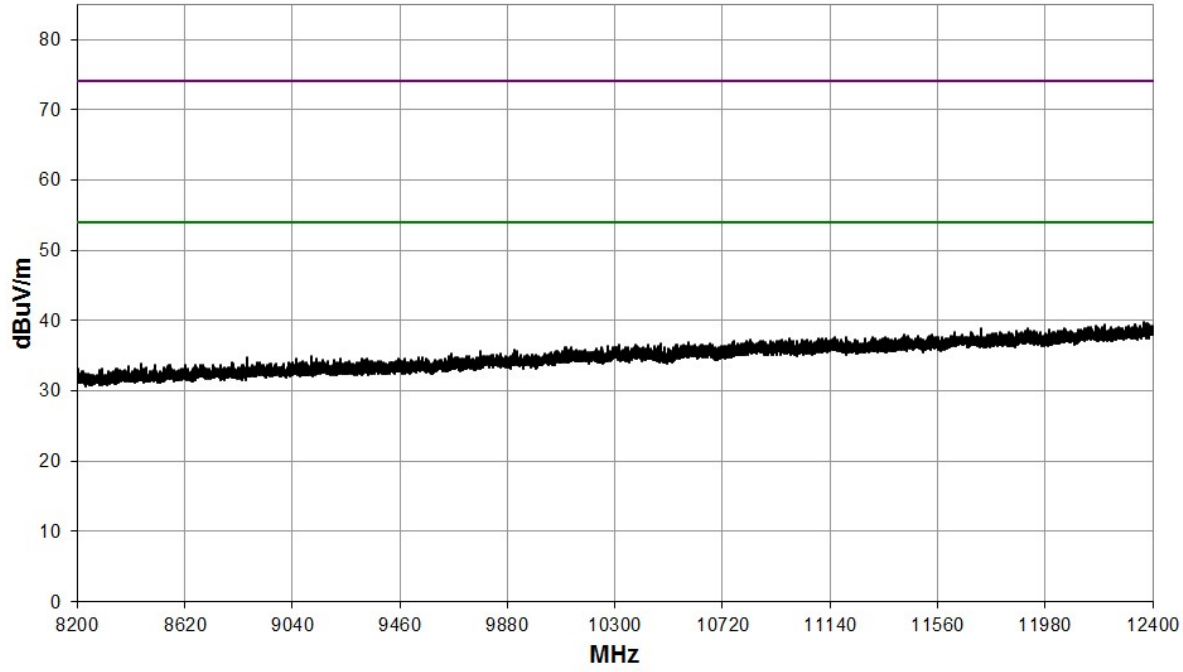
1 GHz to 4 GHz



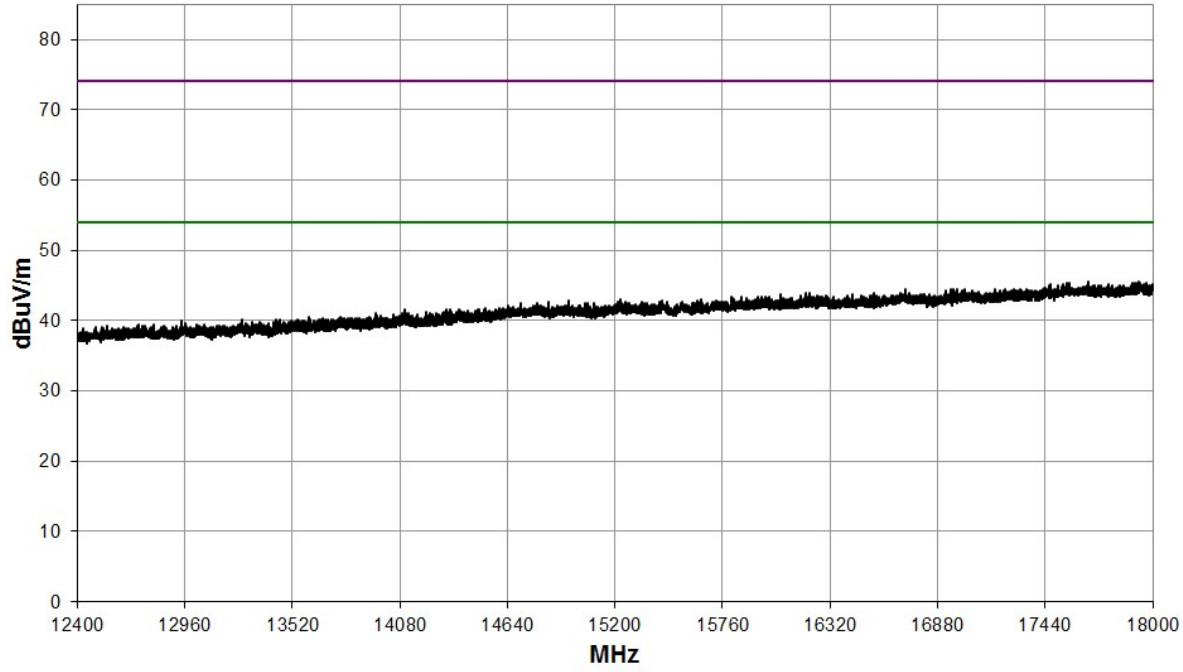

4 GHz to 8.2 GHz



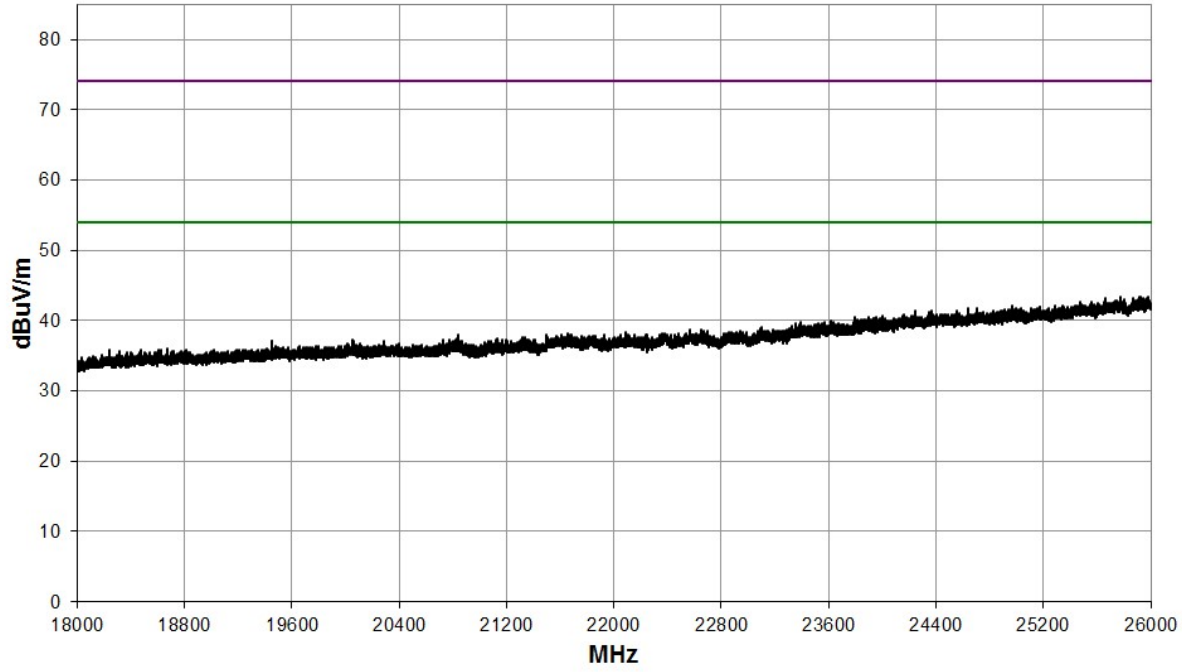
8.2 GHz to 12.4 GHz




12.4 GHz to 18 GHz

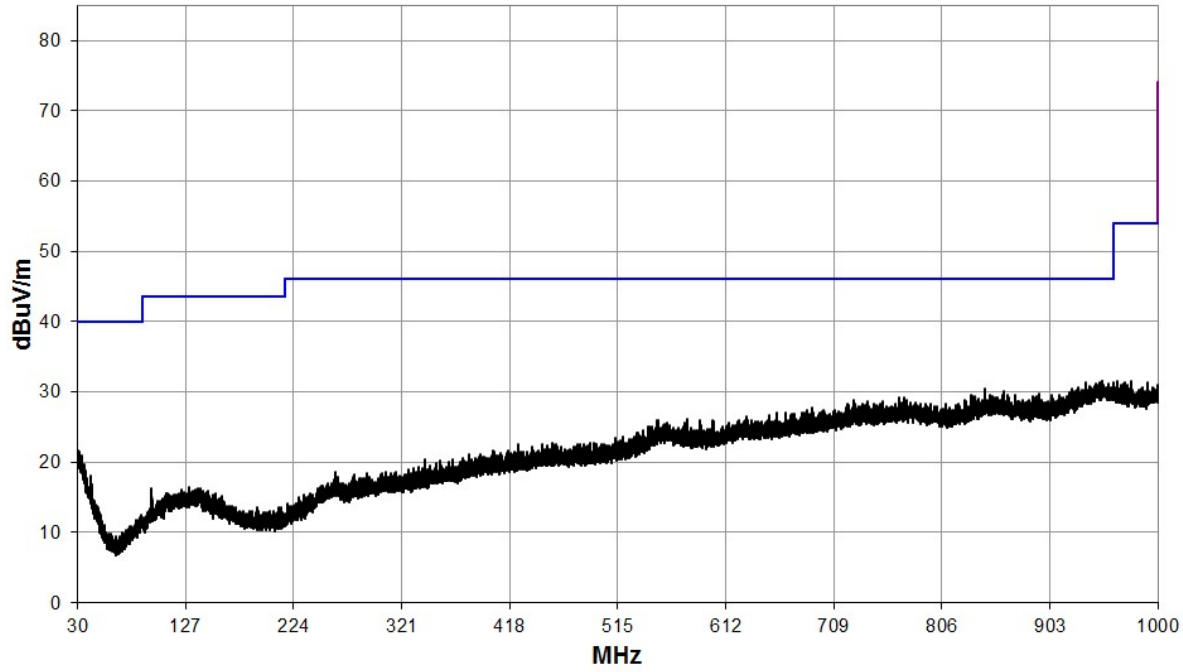


18 GHz to 26 GHz

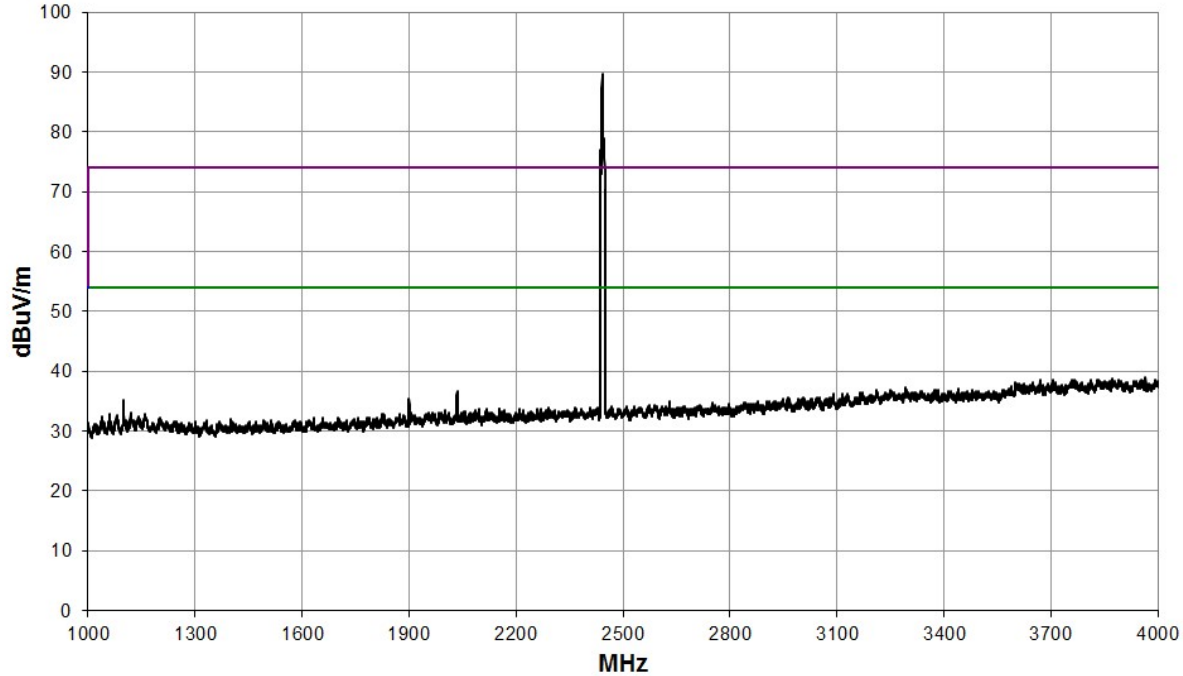


| Frequency: 2442 MHz; Power Setting: Default; Modulation: GFSK | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| ***Detector*** | ***Freq. (MHz)*** | ***Meas'd Emission (dBµV)*** | ***Factor (dB)*** | ***Duty Cycle Corr'n (dB)*** | ***Distance Extrap'n Factor (dB)*** | ***Field Strength (dBµV/m)*** | ***Limit (dBµV/m)*** | ***Margin (dB)*** |
| No spurious emissions were detected within 20 dB of the limit. | | | | | | | | |

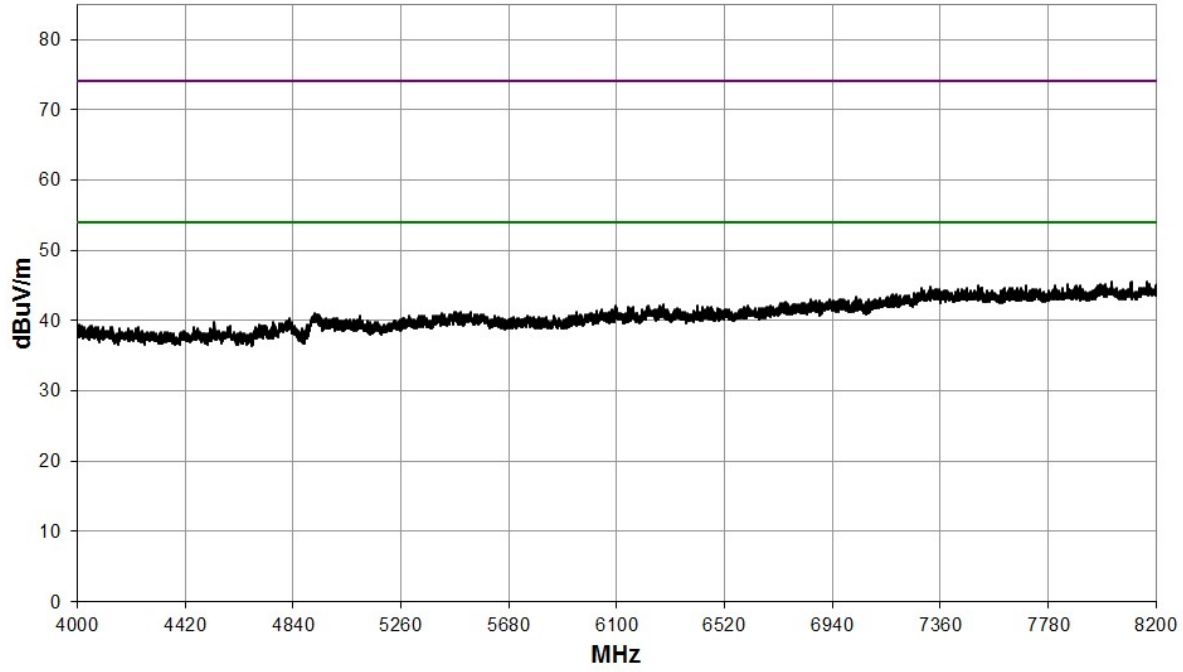
30 MHz to 1 GHz



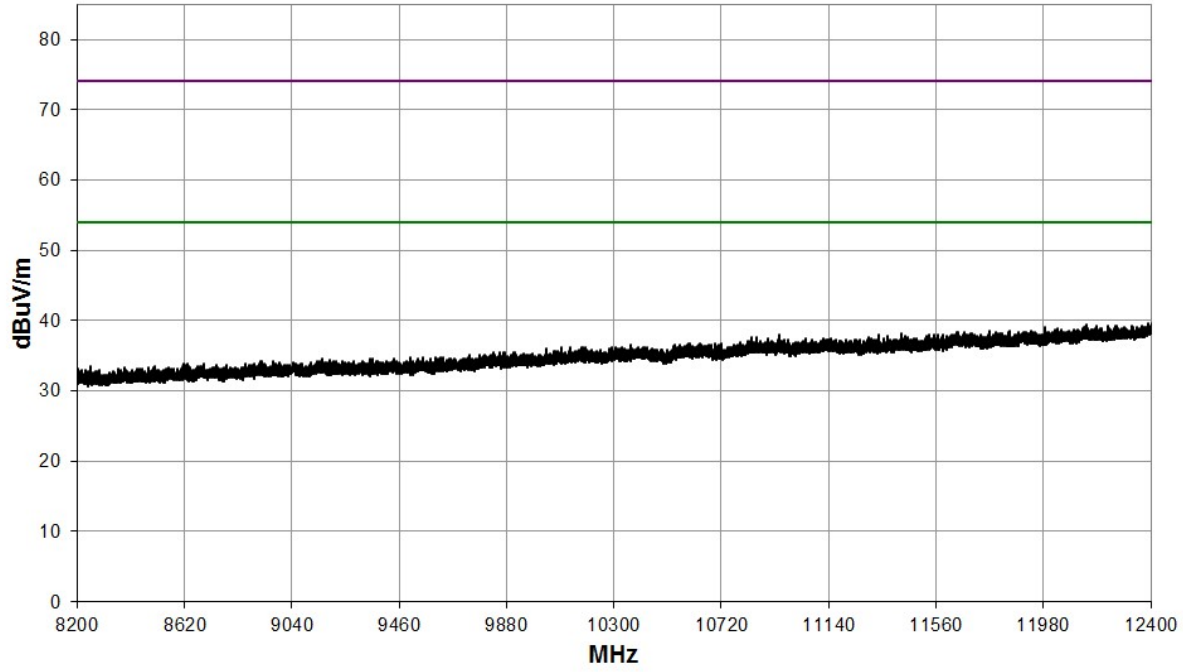

1 GHz to 4 GHz



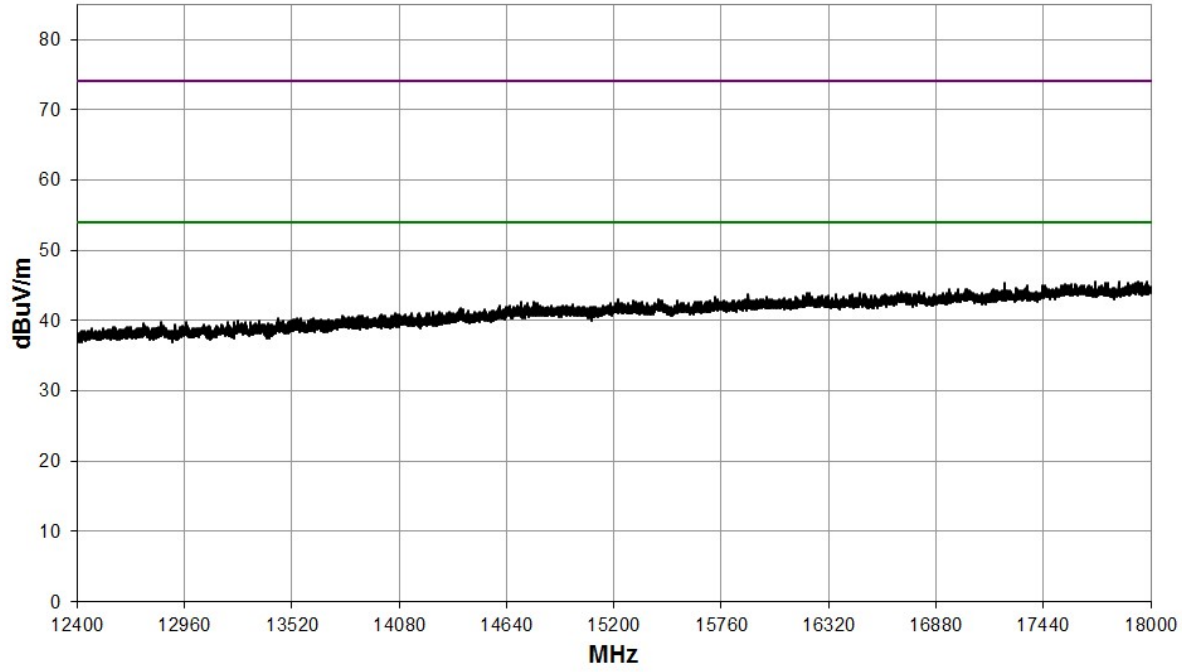
4 GHz to 8.2 GHz



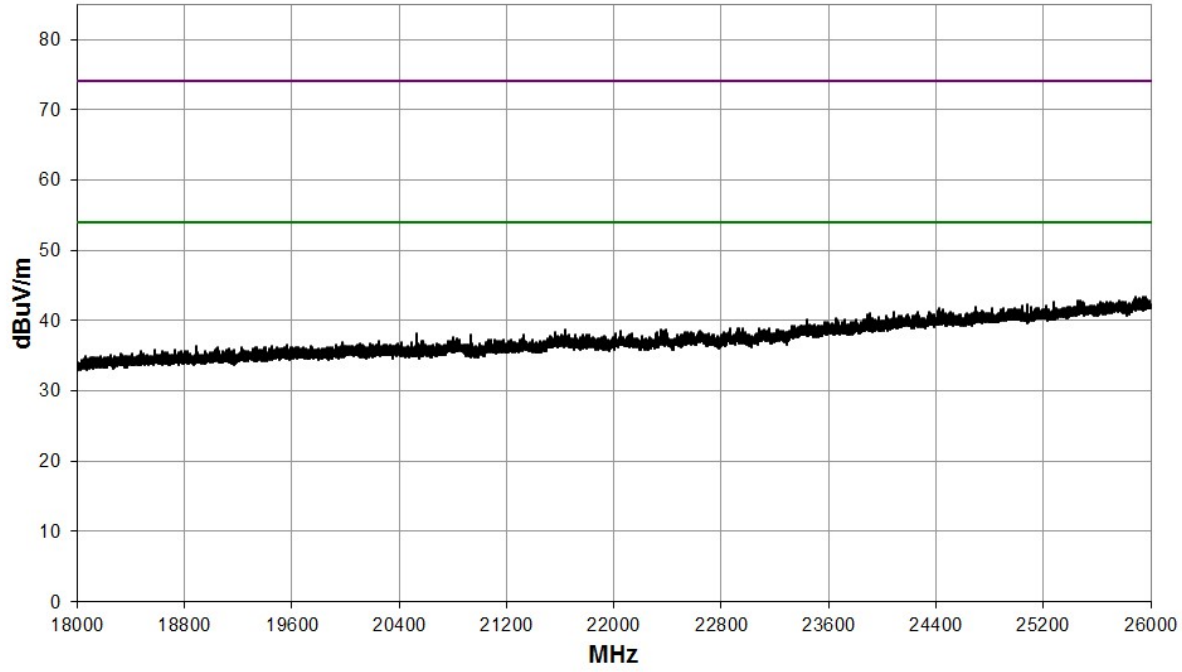

8.2 GHz to 12.4 GHz



12.4 GHz to 18 GHz

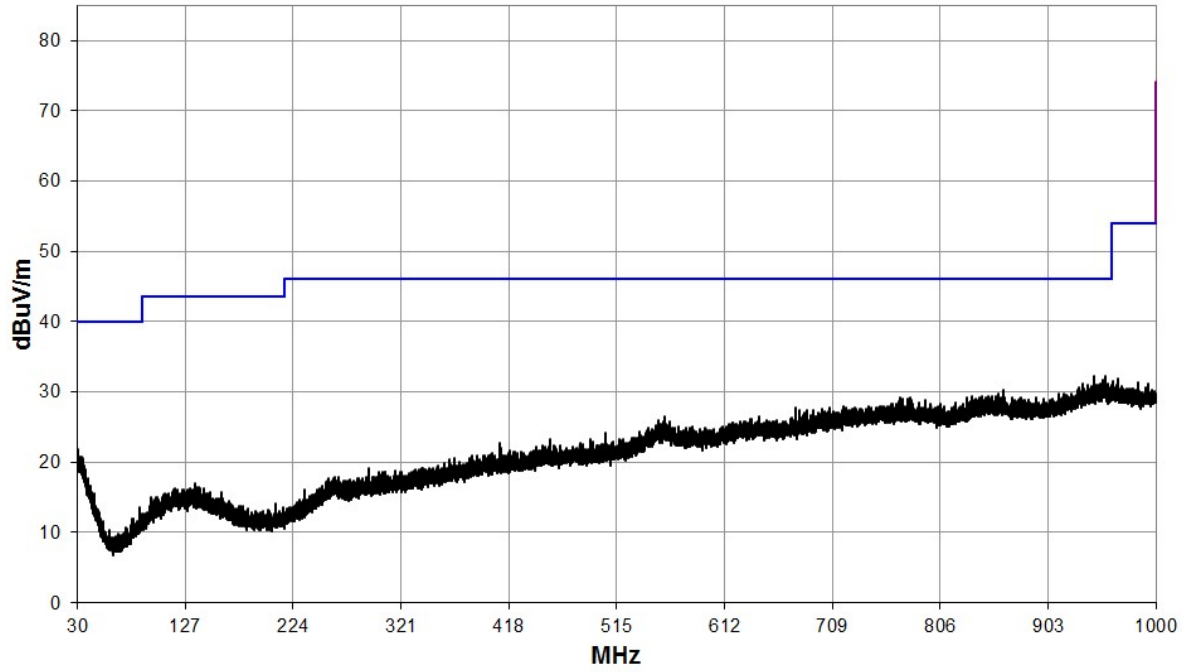



18 GHz to 26 GHz

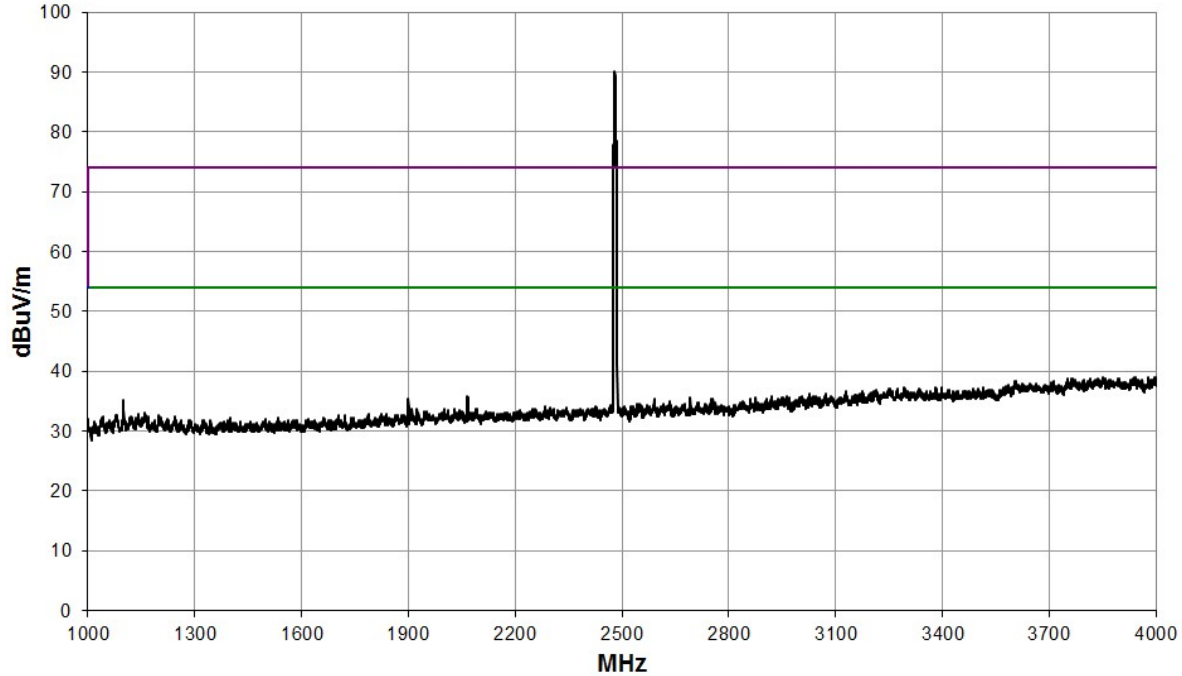


| Frequency: 2480 MHz; Power Setting: Default; Modulation: GFSK | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| ***Detector*** | ***Freq. (MHz)*** | ***Meas'd Emission (dBµV)*** | ***Factor (dB)*** | ***Duty Cycle Corr'n (dB)*** | ***Distance Extrap'n Factor (dB)*** | ***Field Strength (dBµV/m)*** | ***Limit (dBµV/m)*** | ***Margin (dB)*** |
| No spurious emissions were detected within 20 dB of the limit. | | | | | | | | |

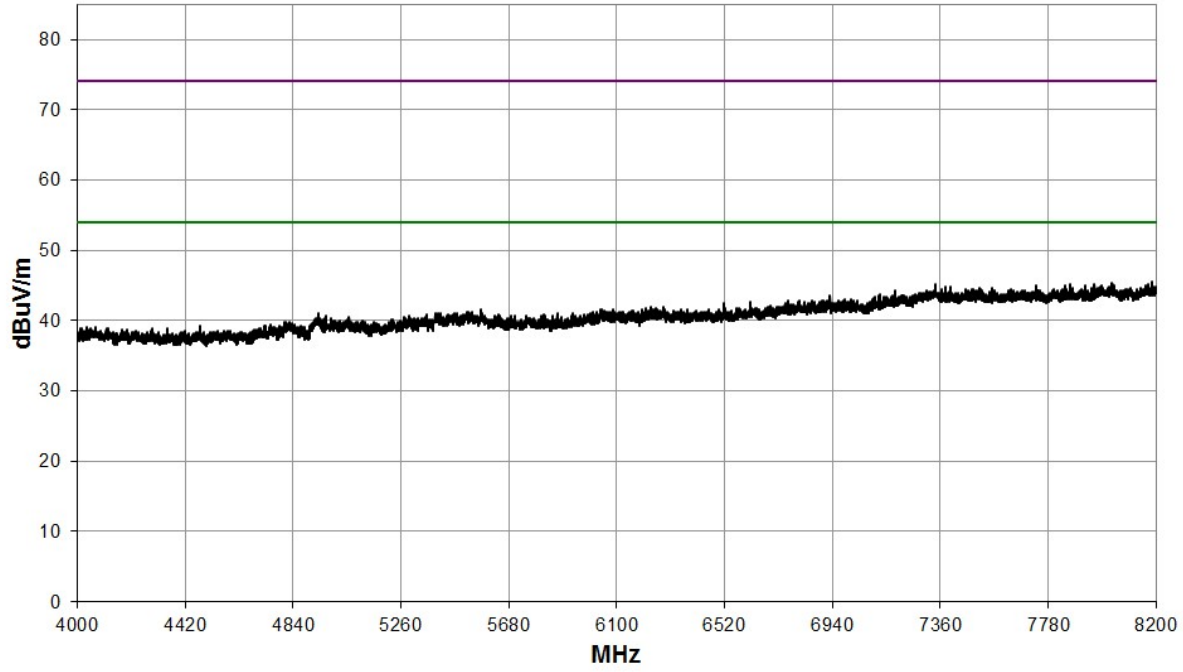
30 MHz to 1 GHz



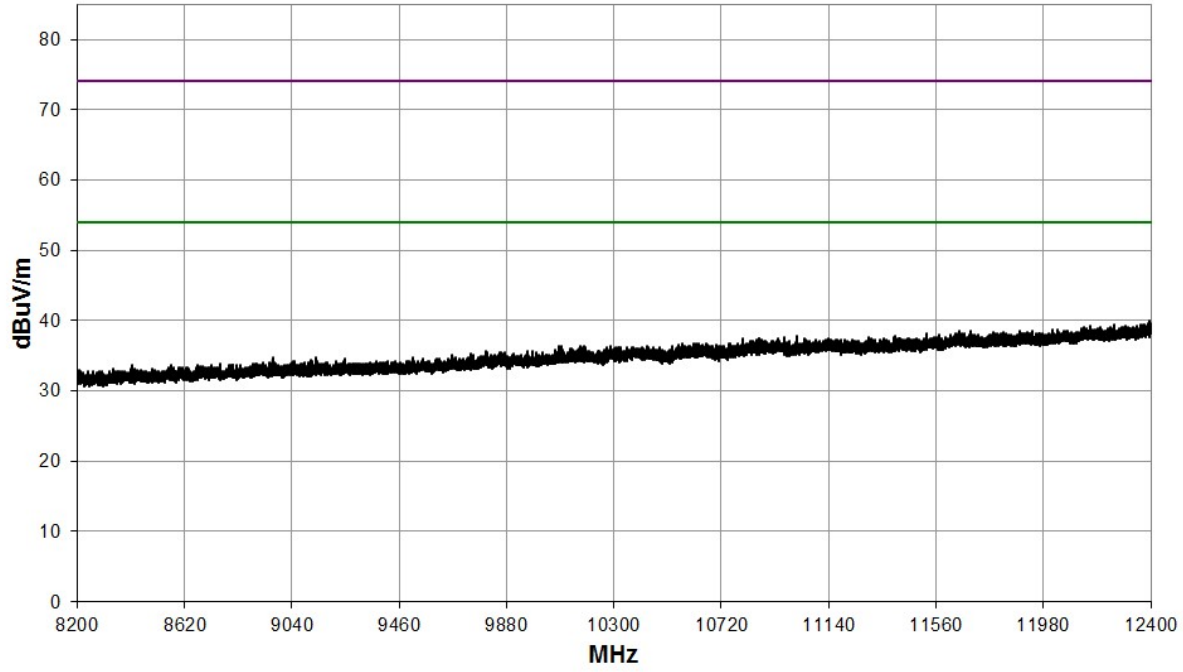

1 GHz to 4 GHz



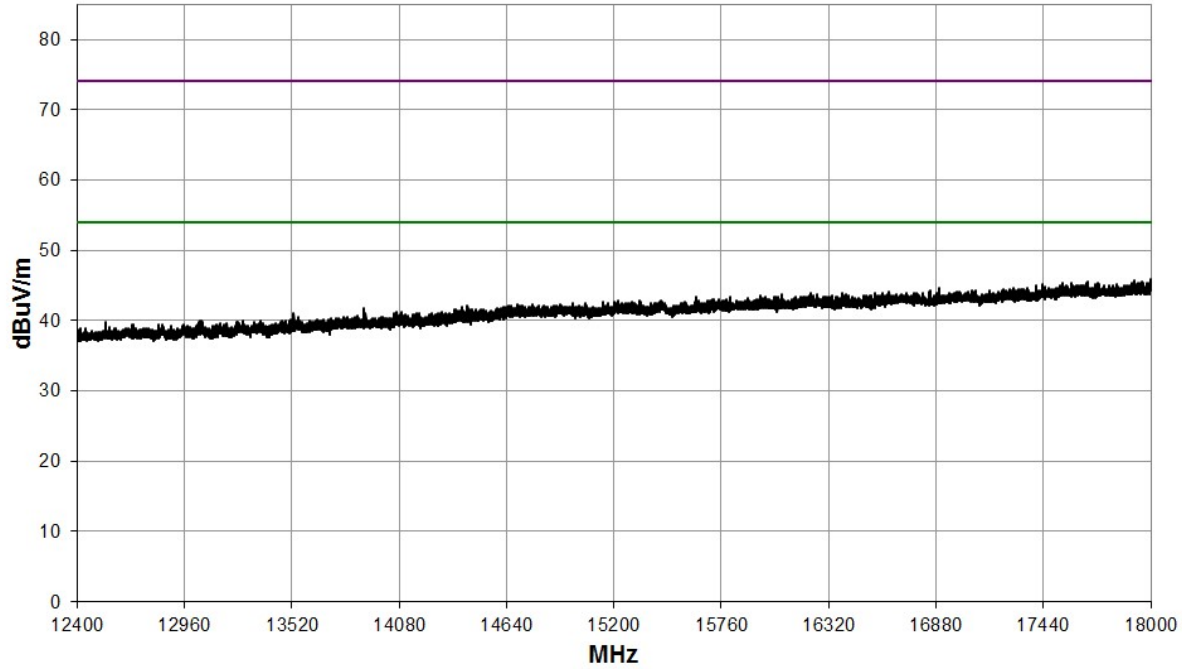
4 GHz to 8.2 GHz



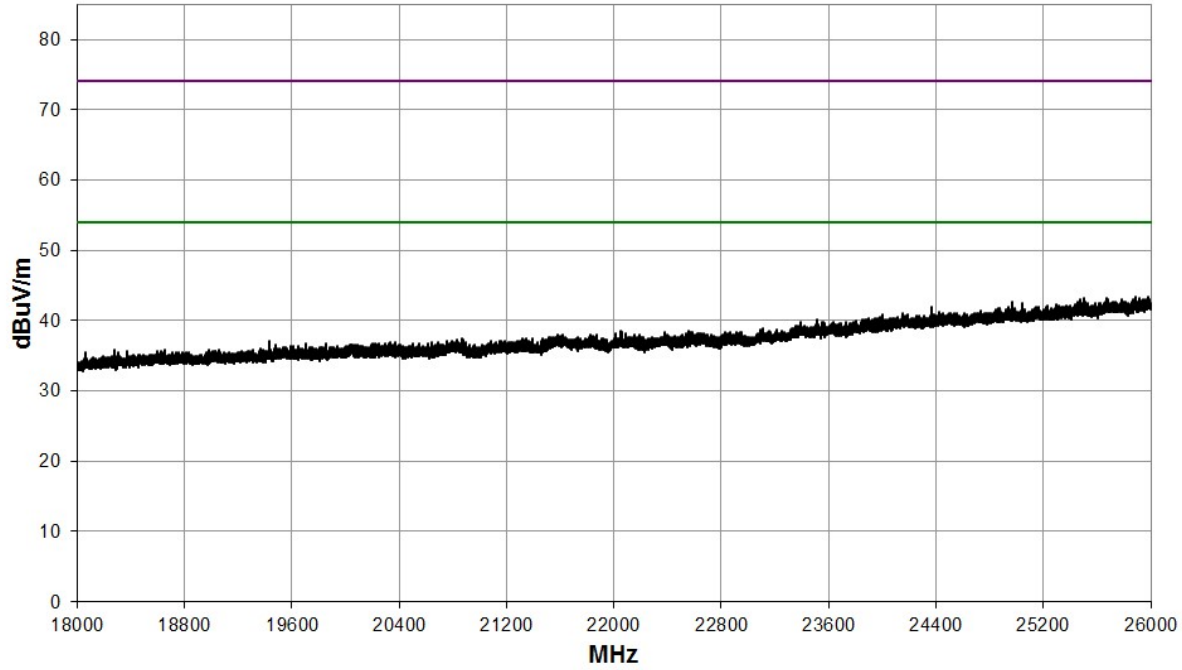

8.2 GHz to 12.4 GHz



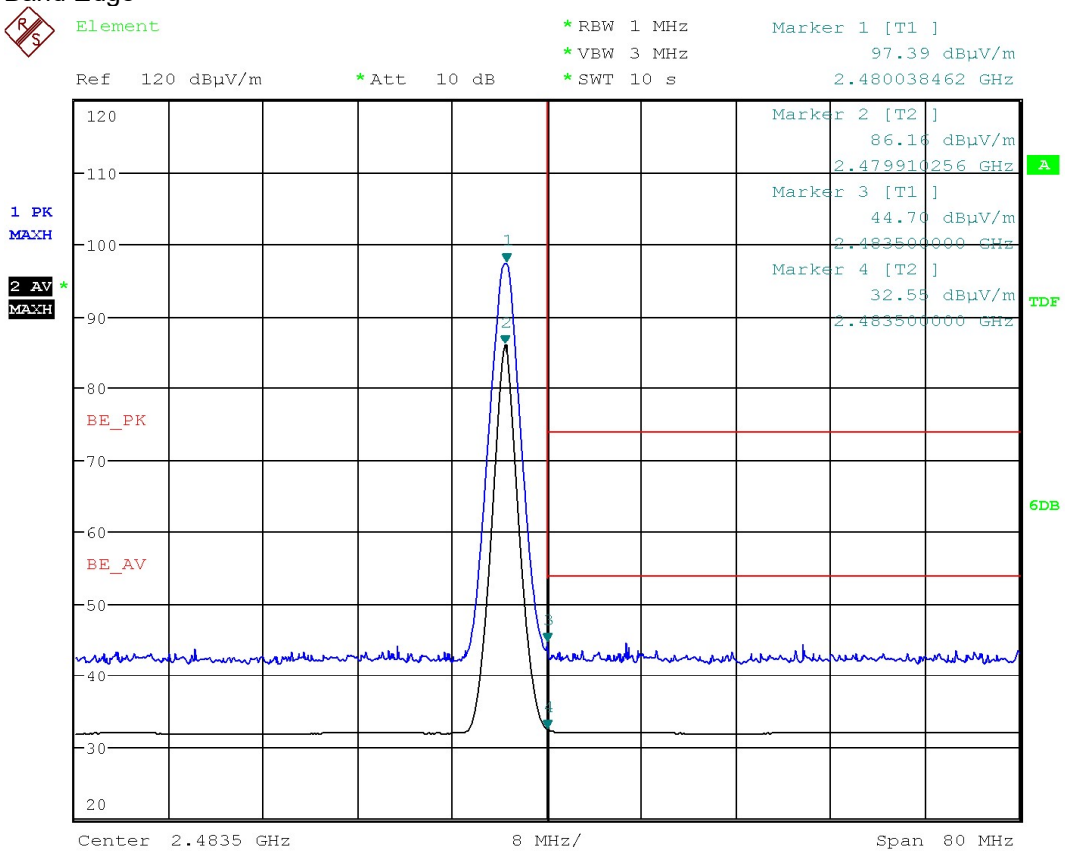
12.4 GHz to 18 GHz




18 GHz to 26 GHz



## Band Edge




Date: 22.JUL.2022 12:20:00

| *Band Edge Measurement; Frequency: 2480 MHz; Power Setting: Default* | | | | | | |
|---|---|---|---|---|---|---|
| ***Detector*** | ***Freq. (MHz)*** | ***Meas'd Emission (dBµV/m)*** | ***Duty Cycle Corr'n (dB)*** | ***Field Strength (dBµV/m)*** | ***Limit (dBµV/m)*** | ***Margin (dB)*** |
| AV | 2483.5 | 32.55 | 10.3 | 42.85 | 54.0 | 11.15 |

# 12 Duty Cycle

## *12.1 Definition*

The ratio of the sum of all pulse durations to the total period, during a specified period of operation.

## *12.2 Test Parameters*

| | |
|---|---|
| Test Location: | Element Hull |
| Test Chamber: | Wireless Lab 2 |
| Test Standard and Clause: | ANSI C63.10-2013, Clause 11.6 |
| Deviations From Standard: | None |
| Temperature Extreme Environment Test Range: | N/A |
| Voltage Extreme Environment Test Range: | N/A |

### Environmental Conditions (Normal Environment)

| | |
|---|---|
| Temperature: 22 °C | +15 ºC to +35 ºC (as declared) |
| Humidity: 40 %RH | 20 %RH to 75 %RH (as declared) |
| Supply: 7.4 Vdc | As declared |

### Test Limits

N/A.

### *12.3 Test Method*

With the EUT setup as per section 9 of this report and connected as per Figure vii, the duty of the EUT was calculated from the sum of total on and off times over the observation period.

The measurements were performed with EUT set at its maximum duty. All modulation schemes, bandwidths, data rates and power settings were used to observe the worst-case configuration.

[1] Single antenna output devices

Duty was measured at a distance of 3 m.

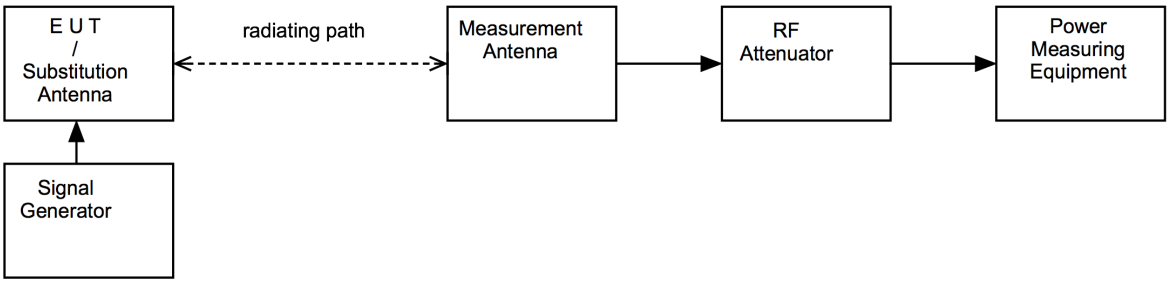
The duty cycle correction factor, DC, shall be added to the measurement results prior to comparing with the emission limit to compute the emission level that would have been measured had the test been performed at 100% duty cycle. The correction factor is computed as:

1) If power averaging (rms) mode was used in step f), then the applicable correction factor is [10 log (1 / *D*)], where *D* is the duty cycle.

2) If linear voltage averaging mode was used in step f), then the applicable correction factor is [20 log (1 / *D*)], where *D* is the duty cycle.

3) If a specific emission is demonstrated to be continuous (*D* ≥ 98%) rather than turning ON and OFF with the transmit cycle, then no duty cycle correction is required for that emission.

**Figure vii Test Setup**

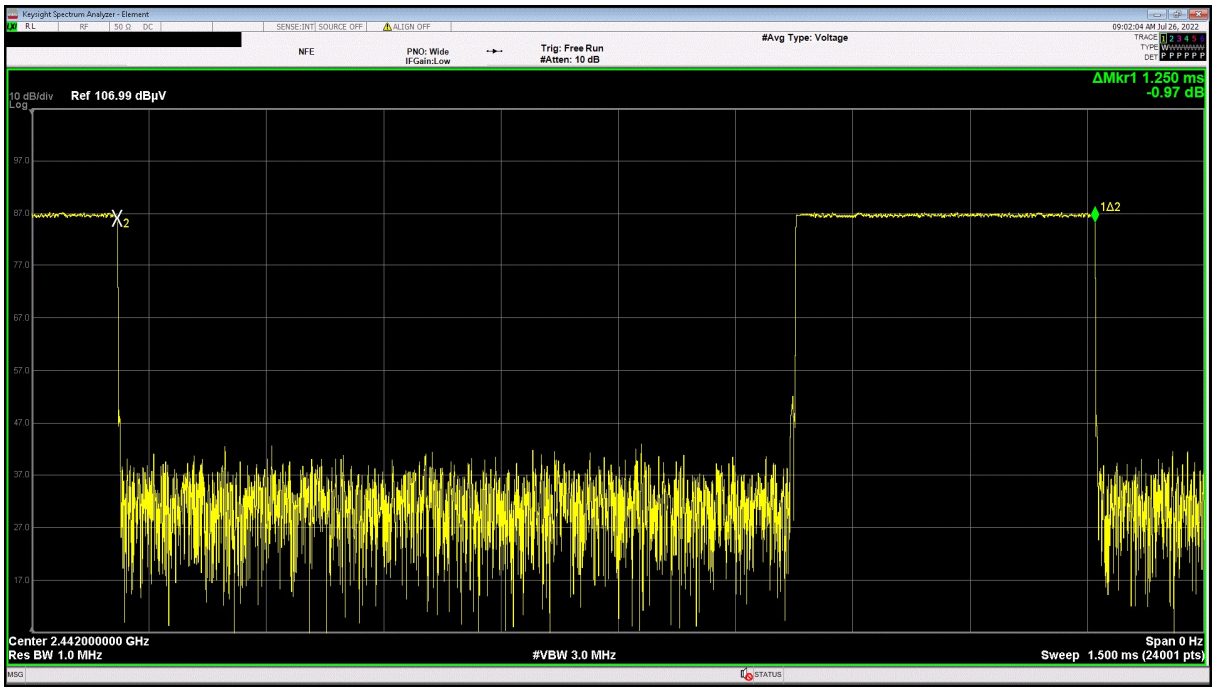


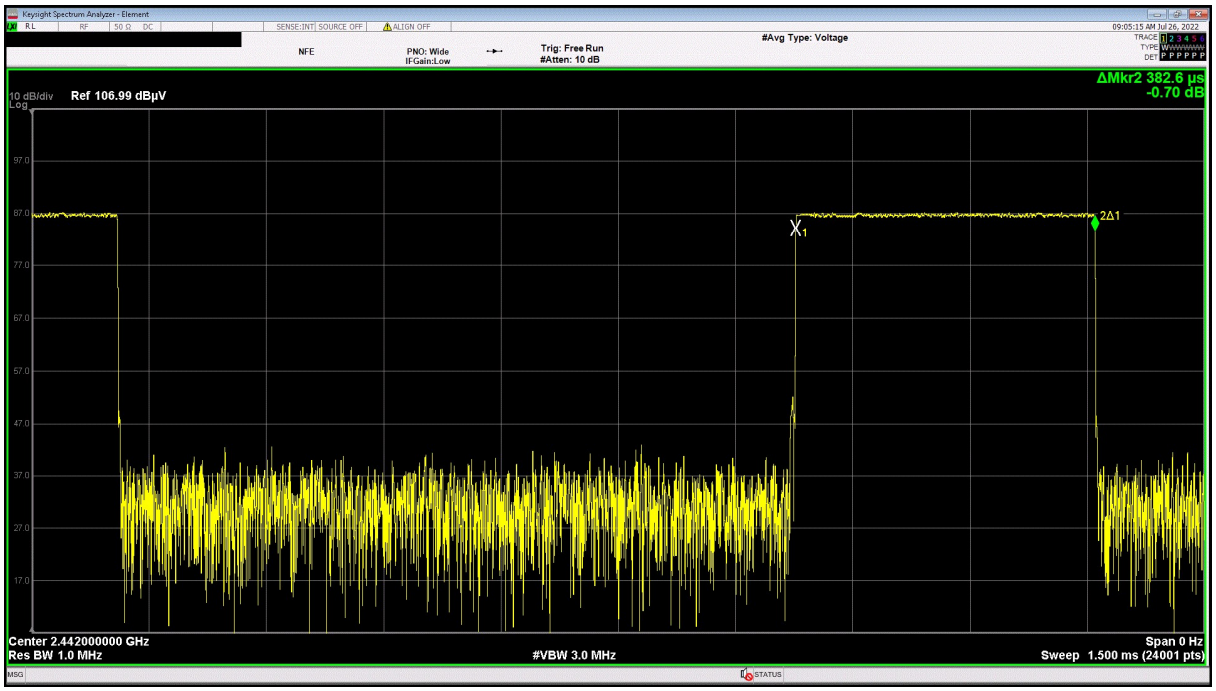

### *12.4 Test Equipment*

| *Equipment Type* | *Manufacturer* | *Equipment Description* | *Element No* | *Due For Calibration* |
|---|---|---|---|---|
| ATS | Rainford | Ferrite Lined Chamber | REF886 | 2024-06-15 |
| N9030A | Agilent | Spectrum Analyser | REF2167 | 2022-08-25 |
| 3115 | EMCO | Horn Antenna | RFG129 | 2024-01-31 |

## 12.5 Test Results

| 2.4 GHz BT; Power Setting: Default | | | | |
|---|---|---|---|---|
| Test Environment | | TxOn time (us) | Frame Period (us) | Calculated Factor (dB) |
| $V_{nominal}$ | $T_{nominal}$ | 382.6 | 1250.0 | 10.3 |



# 13 Measurement Uncertainty

## Radio Testing – General Uncertainty Schedule

*All statements of uncertainty are expanded standard uncertainty using a coverage factor of 1.96 to give a 95 % confidence where no required test level exists.*

| Test/Measurement | Budget Number | MU |
|---|---|---|
| **Conducted RF Power, Power Spectral Density, Adjacent Channel Power and Spurious emissions** | | |
| Absolute RF power (via antenna connecter) Dare RPR3006W Power Head | MU4001 | **0.9 dB** |
| Carrier Power and PSD - Spectrum Analysers | MU4004 | **0.9 dB** |
| Adjacent Channel Power | MU4002 | **1.9 dB** |
| Transmitter conducted spurious emissions | MU4041 | **0.9 dB** |
| Conducted power and spurious emissions 40 GHz to 50 GHz | MU4042 | **2.4 dB** |
| Conducted power and spurious emissions 50 GHz to 75 GHz | MU4043 | **2.5 dB** |
| Conducted power and spurious emissions 75 GHz to 110 GHz | MU4044 | **2.4 dB** |
| | | |
| **Radiated RF Power and Spurious emissions ERP and EIRP** | | |
| Effective Radiated Power Reverb Chamber | MU4020 | **3.7 dB** |
| Effective Radiated Power | MU4021 | **4.7 dB** |
| TRP Emissions 30 MHz to 1 GHz using CBL6111 or CBL6112 Bilog Antenna | MU4046 | **5.3 dB** |
| TRP Emissions 1 GHz to 18 GHz using HL050 Log Periodic Antenna | MU4047 | **5.1 dB** |
| TRP Emissions 18 GHz to 26.5 GHz using Standard Gain Horn | MU4048 | **2.7 dB** |
| TRP Emissions 26.5 GHz to 40 GHz using Standard Gain Horn | MU4049 | **2.7 dB** |
| | | |
| **Spurious Emissions Electric and Magnetic Field** | | |
| Radiated Spurious Emissions 30 MHz to 1 GHz | MU4037 | **4.7 dB** |
| Radiated Spurious Emissions 1-18 GHz | MU4032 | **4.5 dB** |
| E Field Emissions 18GHz to 26 GHz | MU4024 | **3.2 dB** |
| E Field Emissions 26GHz to 40 GHz | MU4025 | **3.3 dB** |
| E Field Emissions 40GHz to 50 GHz | MU4026 | **3.5 dB** |
| E Field Emissions 50GHz to 75 GHz | MU4027 | **3.6 dB** |
| E Field Emissions 75GHz to 110 GHz | MU4028 | **3.6 dB** |
| Radiated Magnetic Field Emissions | MU4031 | **2.3 dB** |
| | | |
| **Frequency Measurements** | | |
| Frequency Deviation | MU4022 | **0.316 kHz** |
| Frequency error using CMTA test set | MU4023 | **113.441 Hz** |
| Frequency error using GPS locked frequency source | MU4045 | **0.0413 ppm** |
| | | |
| **Bandwidth/Spectral Mask Measurements** | | |
| Channel Bandwidth | MU4005 | **3.87 %** |
| Transmitter Mask Amplitude | MU4039 | **1.3 dB** |
| Transmitter Mask Frequency | MU4040 | **2.59 %** |
| | | |
| **Time Domain Measurements** | | |
| Transmission Time | MU4038 | **4.40 %** |
| | | |
| **Dynamic Frequency Selection (DFS) Parameters)** | | |
| DFS Analyser - Measurement Time | MU4006 | **679 µs** |
| DFS Generator - Frequency Error | MU4007 | **92 Hz** |
| DFS Threshold Conducted | MU4008 | **1.3 dB** |
| DFS Threshold Radiated | MU4009 | **3.2 dB** |
| | | |

| Test/Measurement | Budget Number | MU |
|---|---|---|
| **Receiver Parameters** | | |
| EN300328 Receiver Blocking | MU4010 | **1.1 dB** |
| EN301893 Receiver Blocking | MU4011 | **1.1 dB** |
| EN303340 Adjacent Channel Selectivity | MU4012 | **1.1 dB** |
| EN303340 Overloading | MU4013 | **1.1 dB** |
| EN303340 Receiver Blocking | MU4014 | **1.1 dB** |
| EN303340 Receiver Sensitivity | MU4015 | **0.9 dB** |
| EN303372-1 Image Rejection | MU4016 | **1.4 dB** |
| EN303372-1 Receiver Blocking | MU4017 | **1.1 dB** |
| EN303372-2 Adjacent Channel Selectivity | MU4018 | **1.1 dB** |
| EN303372-2 Dynamic Range | MU4019 | **0.9 dB** |
| Receiver Blocking Talk Mode Conducted | MU4033 | **1.2 dB** |
| Receiver Blocking Talk Mode- radiated | MU4034 | **3.4 dB** |
| Rx Blocking, listen mode, blocking level | MU4035 | **3.2 dB** |
| Rx Blocking, listen mode, radiated Threshold Measurement | MU4036 | **3.4 dB** |
| Adjacent Sub Band Selectivity | MU4003 | **4.2 dB** |

# 14 Customer Declaration

27 July 2022

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**Declaration no performance differences of Bluetooth, Wi-Fi and GNSS between SC20 models.**

**SC20 series radios including the following models but not limited to SC2020, SC2021, SC2024 & SC2028 use the same Bluetooth & Wi-Fi module (LBEE59B1LV-TEMP) along with a new GNSS module (u-blox m10). The electronic implementation/design of these parts in each model of SC20 radios are identical and no performance difference between them. the only difference between each model is the Tetra frequency range.**

**Signed for and on behalf of Sepura Limited:**

**James O'Reilly**
**Conformance engineer**

**Dated: 27 July 2022**